

GRADE 6 SCIENCE CURRICULUM SPECIFICATIONS

REVISED

LB  
1564  
A3  
C97  
1982  
gr.06  
sci.

CURR HIST

Ex LIBRIS  
UNIVERSITATIS  
ALBERTAENSIS



## GRADE 6 SCIENCE CURRICULUM SPECIFICATIONS

The Grade 6 Science Curriculum Specifications were prepared in July, 1981, under the direction of the Curriculum Branch of Alberta Education, by the Grade 6 Science Committee. The committee consisted of classroom teachers, School Board and Alberta Education personnel. Alberta Education acknowledges with appreciation the contributions of the members of the Grade 6 Science Committee.

K. Kluchky, Alberta Education, CHAIRMAN  
G. Popowich, Alberta Education  
T. Rusnak, Alberta Education  
B. Sheppard, Calgary Board of Education  
J. Crothers, Edmonton Catholic Schools  
B. Jensen, Edmonton Public School Board  
M. Anastasiou, Lac La Biche School Division  
G. Janz, County of Stettler

Three considerations were identified by the committee as major criteria underlying the curriculum specifications for the Grade 6 Science Achievement Test.

1. Curriculum specifications are to be based wholly on the *Program of Studies for Elementary Schools, 1978* (amended 1981).
2. The four major components or divisions of Grade 6 Science are to be included in the specifications. These divisions are:

Process Skills  
Psychomotor Skills  
Attitudes  
Subject Matter

3. Emphases presented are a reflection of what the committee considers to be current status of Division II science of Alberta. Percentage and priority weightings are given for each of the components.
4. In recognition of the nature of the elementary science program, greater emphasis is to be placed on those program components that students have attained throughout Division II.

### WEIGHTING FACTORS

#### Percentage

- refers to the relative emphasis that a particular program component or division will receive.

#### Priority

- refers to the relative importance of a particular program concept, sub-concept or objective.

A	B	C
high priority		low priority



Table 1 outlines the percentage of classroom time recommended for each of the four major divisions of the science curriculum. Table 2 presents the same percentages as they are subdivided for each of the major divisions. Table 3 outlines detailed curriculum specifications.

Table 1

Grade 6 Science -- Major Curriculum Components

MAJOR COMPONENTS	EMPHASIS IN PERCENT
PROCESS SKILLS	50
PSYCHOMOTOR SKILLS	10
ATTITUDES	10
SUBJECT MATTER	30
TOTAL	100

REVISION PROCESS

The interim edition of these curriculum specifications was distributed in the fall of 1981 with reactions to be returned to the Student Evaluation Branch by December 31, 1981. These reactions were then collated and submitted to the Curriculum Branch for revision of the specifications. The revision committee met in late January and made such changes as were considered necessary.

Table 2

## Grade 6 Science -- Curriculum Subdivisions

SUBDIVISIONS	EMPHASES IN PERCENT
PROCESS SKILLS	
Communicating	4
Observing	4
Measuring	4
Classifying	4
Inferring	7
Predicting	7
Controlling variables	8
Interpreting data	8
Experimenting	2
Hypothesizing	1
Defining operationally and formulating models	1
PSYCHOMOTOR SKILLS	
Manipulating	4
Constructing	2
Calibrating	4
ATTITUDES	
Awareness	2
Appreciation of living things	2
Self-confidence	2
Concern for energy resources	2
Continuing interest in science	1
Appreciation of science	1
Value of science	



SUBJECT MATTER		
Matter and energy		
1. Energy resources and conservation	3	13
2. Electricity	2	
3. Light	2	
4. Changes in matter	3	
5. Heat	1	
6. Sound	1	
7. Magnetism	1	
Living things and their environment		
		30
1. Ecosystem	4	
2. Adaptations	3	
3. Environment	3	
4. Environmental factors	2	
Earth/Space/Time		
1. Weather	3	5
2. Water and land	2	
TOTAL		100

Table 3

## Grade 6 Science Curriculum Specifications

PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS		EMPHASES IN PERCENT	TAXONOMIC LEVELS		
				KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
PROCESS SKILLS (50%)						
A	Communicating	1. Drawing simple diagrams, pictures, and maps of increasing sophistication.	4			
A		2. Using written units of measurement and their symbols.				
A		3. Constructing simple pictographs and bar graphs.				
A		4. Extending sophistication in graphing to include histograms, use of coordinate systems, circle graphs.				
A		5. Recording responses by using simple symbols (e.g. x's, ✓'s).				
A		6. Filling in charts using simple symbols.				
A		7. Using number symbols.				
B		8. Describing ideas and intuitions clearly.				
B		9. Using audio-visual techniques to accentuate reports (written and oral).				
C		10. Describing observations verbally and in written form.				
A	Observing	1. Distinguishing between observations and inferences.	4			
A		2. Describing objects, change and interaction in objects in the environment.				
A		3. Making predictions and inferences on the basis of observation.				



PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS		EMPHASES IN PERCENT	TAXONOMIC LEVELS		
				KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
C	Observing	4. Identifying, by using the five senses, properties or characteristics of objects.				
C		5. Describing an object verbally and in written work, on the basis of sensory information.				
C		6. Describing quantitative characteristics of objects.				
C		7. Describing qualitative changes in objects.				
A	Measuring	1. Collecting data by using appropriate measuring devices.	4			
A		2. Performing necessary mathematical operations when taking measurements.				
A		3. Selecting appropriate units of measurement.				
A		4. Perceiving mathematical relationships between the units of measurement.				
A		5. Organizing measurement data into communicable forms such as graphs, charts, tables.				
A		6. Making inferences and predictions from measurement data.				
A		7. Using simple instruments for measurement.				
A		8. Selecting appropriate devices for measuring.				
A		9. Estimating the approximate measurement of an object.				
B		10. Constructing simple instruments for measurement.				
C		11. Making comparative measurements - lighter than, heavier than.				
C		12. Ordering on the basis of comparative measurement.				

PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS		EMPHASES IN PERCENT	TAXONOMIC LEVELS		
				KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
A	Measuring	13. Using appropriate measuring devices with skill.				
C		14. Using arbitrary units (washers, paper clips, swings of a pendulum).				
C		15. Discovering need for standard units.				
A	Classifying	1. Identifying the condition or basis of a given classification set.	4			
A		2. Constructing classification schemes or keys diagrammatically, or in some other communicable form.				
A		3. Identifying, through deductive thinking, an unidentified object in a classification scheme, given various classification conditions.				
B		4. Applying some form of self-devised classification scheme on any given set of objects, situations, or events.				
C		5. Classifying objects according to attributes or properties (color, shape, size, texture, etc.).				
C		6. Classifying objects first on one property, then on two properties, and so on.				
C		7. Classifying objects, situations, or events according to given or self-imposed conditions.				
A	Inferring	1. Distinguishing between observations and inferences (realizing that an inference is an explanation of an observation).	7			
A		2. Recognizing that inferences are, by nature, tentative. Children demonstrate this understanding by wording their statements about inferences using terms such as "I think it is . . .", "It might be . . .", etc.				

PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS		EMPHASES IN PERCENT	TAXONOMIC LEVELS		
				KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
B	Inferring	3. Making as many observations as possible, and choosing only those inferences that account for all observations made.				
B		4. Testing inferences by making more observations, and revising inferences if additional observations do not support the original inference.				
B		5. Making and testing inferences when confronted with unfamiliar phenomena.				
B		6. Applying the inferring process to situations which require direct observations.				
C		7. Making observations by using all five senses.				
A	Predicting	1. Testing the results of a prediction by a. teacher-directed tests b. student-constructed tests	7			
A		2. Retesting the results of a previously incorrect but revised prediction.				
A		3. Controlling variables that may affect a prediction.				
A		4. Recording a prediction and its outcome in symbol or written form.				
A		5. Making predictions from recorded data, e.g. map, graph or model.				
A		6. Constructing reasonable predictions.				
B		7. Determining the dependability of a prediction.				
C		8. Stating a prediction based on past experience.				
C		9. Measuring for accuracy.				

PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS		EMPHASES IN PERCENT	TAXONOMIC LEVELS		
				KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
A	Controlling variables	1. Identifying variables that might influence a phenomenon that is being investigated.	8			
A		2. Identifying variables which should be kept the same, and variables which should be changed, in an investigation.				
A		3. Designing simple investigations in which one variable is changed and all others are kept the same.				
A		4. Demonstrating ways to keep variables constant while changing one variable in a variety of situations.				
A	Interpreting data	1. Identifying patterns.	8			
A		2. Extracting useful information.				
B		3. Generalizing from the patterns.				
B		4. Organizing observations meaningfully using - tables - charts - graphs				
C		5. Recording observations.				
A	Experimenting	1. Applying problem-solving skills, given an identified problem.	2			



PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS		EMPHASES IN PERCENT	TAXONOMIC LEVELS					
				KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES			
A	Hypothesizing	1. Considering and examining critically, all possible explanations.	1						
A		2. Identifying influencing variables.							
A		3. Constructing testable hypotheses.							
B		4. Demonstrating ability to make serious guesses or explanations regarding observations of an event or situation.							
A	Defining operationally & formulating models	1. Writing an operational definition of an object or event for which the child has had direct experience.	1						
A		2. Writing more than one operational definition for a given object or event.							
C		3. Identifying an operational definition from a list.							
C		4. Distinguishing between operational definitions and nonoperational definitions.							
PSYCHOMOTOR SKILLS (10%)									
	Manipulating					4			
	Constructing					2			

PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS		EMPHASES IN PERCENT	TAXONOMIC LEVELS		
				KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
	Calibrating		4			
ATTITUDES* (10%)						
A	Awareness	An awareness of, appreciation of, and an interest in the environment, and the need for a responsible attitude toward conservation.	2			
A	Appreciation of living things	An appreciation of the beauty, uniqueness, and interdependence of all living things.	2			
A	Self-confidence	Confidence on the part of students in their own developing abilities to explore and interpret objects and events in their environments.	2			
A	Concern for energy resources	An awareness and concern for the responsible use of energy resources.	2			

\*A's to receive 8% of emphasis.

B's to receive 1% of emphasis.

C's to receive 1% of emphasis.



PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS		EMPHASES IN PERCENT	TAXONOMIC LEVELS		
				KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
B	Continuing interest in science	A continuing interest in each area of science studied.	1			
C	Appreciation of science	An appreciation of science and the scientific enterprise in terms of the impact it has made on our lives.	1			
C	Value of science	An interest in the value of science as a means of understanding the world.				

PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS		EMPHASES IN PERCENT	TAXONOMIC LEVELS		
				KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
SUBJECT MATTER (30%)						
	Matter and energy	1. Energy Resources & Conservation	3 13			
A		a. Energy resources can be classified as renewable and non-renewable.		A	A	
A		b. Energy exists in many forms (e.g. light, heat, chemical, nuclear).		A		
A		c. Alberta has a number of major energy resources (coal, sunshine, oil, natural gas).		A		
A		d. Our lifestyle and consumer behavior determine our use and misuse of energy sources.			A	A
A		e. Alternative energy resources exist, in addition to the fossil fuels (e.g. solar, wind, biomass, thermal, nuclear).		A		
A		f. There are advantages, disadvantages, problems, costs, and risks associated with all energy resources.		A	A	A
A		g. Energy can be conserved in many ways (e.g. recycling and reuse of waste products, change in consumer demands, change in lifestyle, change in technology).		A	A	A
A		h. New sources of energy will be required in the future (e.g. fusion, gasohol).		A	A	
A		i. Society must examine the "trade-offs" that are part of our energy-consuming lifestyle.			A	A
B		j. Our use of energy can have adverse effects on the environment (extraction, production, consumption, waste energy).		A	A	A

PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS		EMPHASES IN PERCENT	TAXONOMIC LEVELS		
				KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
	3. Light					
A	Matter and energy	a. Lenses and prisms can be used to concentrate or disperse light.	2	A	A	
A		b. White light is a combination of light of all the colors of the spectrum.		A	A	
A		c. A beam of light can be reflected or refracted.		A	A	
B		d. An object may be seen when it reflects light.		A	A	
B		e. Some objects produce their own light.		A	A	
B		f. Light becomes less intense as the distance increases between the observation and the source.		A	A	
B		g. The color, lustre and composition of material affects the degree to which it reflects or absorbs light.		A	A	
B		h. Objects can be classified as transparent, opaque or translucent.		A	A	
B		i. Light tends to travel in straight lines.		A	A	
	4. Changes in Matter					
A		a. Physical changes alter such properties as size, shape, form, and color. These changes are usually reversible.	3	A	A	
A		b. Chemical changes produce new materials with different properties. Some chemical changes can be reversed but many cannot (e.g. burning).		A	A	A

PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS		EMPHASES IN PERCENT	TAXONOMIC LEVELS		
				KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
	2. Electricity					
A	Matter and energy	a. When some materials are rubbed together, the materials receive an electrical charge.	2	A	A	
A		b. An object that has an electrical charge can attract or repel another charged object.		A	A	
A		c. There are two different kinds of electrical charges (a positive charge and a negative charge).		A	A	
A		d. Electrical charges move through a conductor forming an electrical current.			A	
A		e. An electrical current can be produced by chemical means.		A	A	
B		f. Simple electrical circuits can be constructed using a bulb, wire and a cell.		A	A	A
B		g. In a simple circuit certain variables can be manipulated (number of bulbs, cells, thickness and length of wire).		A	A	A
B		h. Circuits can be open (incomplete) or closed (complete).		A	A	A
A		i. Certain materials are better conductors of electrical energy than others (conductors, non-conductors).		A	A	A



PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS		EMPHASES IN PERCENT	TAXONOMIC LEVELS		
				KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
A	Matter and energy	c. Liquids differ in properties such as density, cohesiveness, and surface tension.	1	A	A	
C		d. Materials can be classified as acids, bases or neutral by their effect upon indicators such as litmus or bromothymol blue (BTB) solution.			A	
		5. Heat				
B		a. Heat energy passes through some materials easily (conductors) and not so easily in others (insulators).		A	A	
B		b. Heat gain or heat loss can be indicated by using a thermometer.		A	A	
B		c. Heat energy transfers from warmer objects to cooler objects.		A	A	
B		d. The kind of matter and its color are variables that affect the rate of heat energy transfer.		A	A	A
B		e. Conduction and convection are two ways heat energy can be transferred.		A	A	
B		f. Contraction or expansion of matter, and other physical changes, are caused by gain or loss of heat energy.		A	A	A
		6. Sound				
B		a. Noise pollution is a serious problem and can be controlled.			A	A
C		b. Sound is caused by vibrations.			A	

PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS	EMPHASES IN PERCENT	TAXONOMIC LEVELS		
			KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
	1. Ecosystems				
A	a. Organisms interact within a community.	4 12	A	A	A
A	b. Food is cycled within an environment (producer, consumer, decomposer).		A	A	A
A	c. Populations interact with each other in food chains, and in more complex food webs.		A	A	A
A	d. Green plant populations are classified as producers.		A	A	
A	e. The living and nonliving parts of an environment make up an ecosystem.		A	A	A
A	f. Populations change in response to changes in the ecosystem.		A	A	
B	g. Populations of animals depend on other populations for food: (i) the plant eaters (herbivores) (ii) the animal eaters (carnivores)		A	A	
B	h. Some animals interact in a predator-prey relationship.		A	A	
B	i. Human populations are consumers.		A	A	
B	j. Populations compete for the things they require to sustain life.		A		A

Living things and environment



PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS	EMPHASES IN PERCENT	TAXONOMIC LEVELS		
			KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
	2. Adaptations	3			
A	a. Structural and behavioral adaptations enable organisms to survive in their environment.		A	A	A
A	b. Some organisms develop through stages of a life cycle, with each stage exhibiting special adaptations.		A	A	A
B	c. Camouflage is one kind of adaptation.		A	A	A
B	d. Organisms show behavioral adaptations to environmental changes (e.g. migration, hibernation).		A	A	A
	3. Environment	3			
A	a. Living things survive when they adapt to changes in their environment.		A	A	
A	b. Man's influence on the environment has been positive and negative (e.g. chemicals capable of pest control and improved soil fertility are also capable of harming the environment).			A	A
B	c. Some living things have adapted to man; some have been endangered by man's actions.			A	A
B	d. People need to examine solutions for environmental problems and need to consider steps to improve the quality of the environment.			A	A
B	e. Man's future will be influenced by his present consumer behavior and by his interaction with the environment.			A	A
C	f. The earth is a closed system, with the exception of exchange of energy with space.		A		

PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS	EMPHASES IN PERCENT	TAXONOMIC LEVELS		
			KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
	4. Environmental Factors				
B	a. Organisms respond to environmental factors of light, temperature, and moisture.	2	A	A	A
B	b. Organisms live in habitats that have factors favorable to their survival.		A	A	A
	1. Weather				
C	a. Weather consists of interacting factors such as temperature, air pressure, precipitation, humidity.	3	A	A	A
C	b. Weather factors can be measured in many ways (e.g. thermometers, anemometers, barometers, rain gauges).		A	A	
C	c. Clouds require certain conditions for their formation.		A	A	A
C	d. Wind is caused by the movement of air masses.	5	A		
C	e. Rain is formed when many small cloud droplets condense.		A		
C	f. Warm air rises when it is pushed up by cooler, heavier air.		A		
	2. Water and Land				
C	a. Moving water erodes and changes the land over time.	2	A	A	
C	b. Many geological formations (e.g. oxbows, deltas) are a result of the force of moving water.		A	A	
C	c. Soils differ in their capacity to retain or hold water.		A	A	

PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS			EMPHASES IN PERCENT	TAXONOMIC LEVELS		
					KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
C	Earth/Space/Time	d. The water cycle plays an important role in maintaining the earth's surface water.			A	A	A
C		e. The water cycle is affected by weather conditions.			A	A	A
C		f. Water is a precious natural resource that should be conserved and kept unpolluted.				A	A
C		g. Reduced water quality in oceans, seas, rivers, and lakes can be a serious problem to the environment and to mankind.				A	A

PRIORITY	MAJOR DIVISIONS AND SUBDIVISIONS		EMPHASES IN PERCENT	TAXONOMIC LEVELS		
				KNOWLEDGE	APPLICATION & INTERPRETATION	HIGHER MENTAL PROCESSES
C	Matter and energy	c. The pitch of a sound is determined by the number of times an object vibrates in a given time (frequency).	1		A	
C		d. Sound becomes less audible as the distance between the observation and the source increases.			A	
C		e. Solids generally conduct sound better than liquids or gases.			A	
C		f. Materials vary in their ability to conduct or absorb sound.			A	
		7. Magnetism	1			
B		a. When an electrical current passes through a coiled wire it produces an electromagnet.		A		
B		b. The magnetic field extends beyond the magnet itself.		A		A
C		c. Some materials are attracted by a magnet; others are not.		A	A	
C		d. Magnets have two poles.		A	A	
C		e. Unlike poles of any two magnets attract, while like poles repel.		A	A	
C		f. The strength of magnets (magnetism) can be increased.		A	A	A
C		g. Some materials (common iron, steel) can be magnetized.		A	A	



LB 1564 A3 C97 1982 GR-06 SCI-  
GRADE 6 SCIENCE CURRICULUM  
SPECIFICATIONS -- /REV --

39689726 CURR HIST



## DATE DUE SLIP

[illegible]

LB

F255

C

I

